



May 19, 2014

10 CFR 50.73

Docket No. 50-443

SBK-L-14091

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

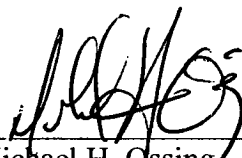
Seabrook Station
Licensee Event Report (LER) 2014-001
Reactor Trip Due to Delay in Bus Transfer Resulting in RCP Loop Low Flow

Enclosed is Licensee Event Report (LER) 2014-001. This LER reports an event that occurred at Seabrook Station on April 1, 2014. This event is being reported pursuant to the requirements of 10 CFR 50.73(a)(2)(iv)(A).

Should you require further information regarding this matter, please contact me at (603) 773-7512.

Sincerely,

NextEra Energy Seabrook, LLC



Michael H. Ossing
Licensing Manager

cc: W. Dean, NRC Region I Administrator
J. G. Lamb, NRC Project Manager
P. Cataldo, NRC Senior Resident Inspector

IE22
NRR

**LICENSEE EVENT REPORT (LER)**(See Page 2 for required number of
digits/characters for each block)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollections.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME

Seabrook Station

2. DOCKET NUMBER

05000443

3. PAGE

1 OF 4

4. TITLE

Automatic Reactor Trip Due to Delay in Automatic Bus Transfer Resulting in RCP Loop Low Flow

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
04	01	2014	2014	- 001	- 00	05	19	2014	FACILITY NAME	DOCKET NUMBER
										05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)			
1	<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)
	<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)
	<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)
	<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)
10. POWER LEVEL 015	<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
	<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)
	<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)
	<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER
	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER**LICENSEE CONTACT**

Michael Ossing, Licensing Manager

TELEPHONE NUMBER (Include Area Code)

603-773-7512

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX

14. SUPPLEMENTAL REPORT EXPECTED☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO**15. EXPECTED SUBMISSION DATE**

MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)

On April 1, 2014 at 00:26 while operating at approximately 15% power following turbine shutdown and removal of the main generator from service, Seabrook Station experienced an automatic reactor trip on reactor coolant two loop loss of flow. The loss of flow was the result of the unexpected closure of the main generator breaker (MGB) "B" phase resulting in 345KV bus 6 de-energizing to isolate the generator breaker. All buses transferred to the reserve auxiliary transformers as designed; however, a slight delay in the automatic transfer for bus 1 resulted in two reactor coolant pumps (RCP) tripping. The RCPs tripping resulted in an automatic reactor trip due to reactor coolant loop low flow. The emergency feedwater system actuated on low SG level, and plant equipment functioned as expected. No adverse consequences resulted from this event.

The root cause is inadequate procedural guidance as the procedure used for MGB operation lacked appropriate information regarding local/remote selector switch position, mitigating actions, and minimizing time with MGB protection defeated. Corrective action is to revise the procedure to add controls to communicate potential risk while switch is in the local position, ensure the use of guarded equipment controls, and minimize the time spent with the switch in local without breaker lock rods installed.

**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Seabrook Station	05000443	2014	- 001	- 00	2 OF 4

NARRATIVE**Description of Event**

On April 1, 2014 at 00:26 while operating at approximately 15% power following turbine shutdown and removal of the main generator from service, Seabrook Station experienced an automatic reactor trip on reactor coolant two loop loss of flow. The loss of flow was the result of the unexpected closure of the main generator breaker [EL, BKR] (MGB) "B" phase resulting in 345KV bus 6 de-energizing to isolate the generator breaker. All buses transferred to the reserve auxiliary transformers (RATs) [EL, XFMR] as designed; however, a slight delay in the automatic transfer for 13.8 kV bus 1 resulted in two reactor coolant pumps [AB, P] (RCP) tripping. The RCPs tripping resulted in an automatic reactor trip due to RCP loop low flow. The emergency feedwater system [BA] actuated on low SG [AB, SG] level, and plant equipment functioned as expected.

Cause of Event

The root cause of the event was determined as:

Inadequate procedural guidance. ON1046.12, Generator Breaker Operation, lacked appropriate information to:

- Communicate that positioning the Main Generator Selector Switch to LOCAL defeated the breaker protection scheme.
- Take mitigating actions (guard equipment, post NSO, etc.).
- Minimize time spent at risk (switch in LOCAL without lock rods installed).

The contributing causes for this event are:

1. Inadvertent contact of the pushbutton during the electrician's inspection of the B cabinet resulted in the unexpected 'B' pole closure.
2. Pressure reducer valve (ED-V-8032) stuck open which resulted in the air leak that contributed to the unexpected 'B' pole closure.

Analysis of the Event

Normally the station buses are supplied from the unit auxiliary transformers (UAT). Opening of a UAT incoming line breaker, either manually or automatically, initiates an automatic transfer from the UAT to the RAT source. The fast transfer is permitted when the UAT and RAT supplies to their respective buses are in synchronism. If the synchronism permissive is not satisfied, the bus will transfer when the bus voltage drops to the residual bus voltage set point.

Investigation determined that buses 2, 3, 4 and 6 "fast transferred" to the RAT as expected. However, buses 1 and 5 did not fast transfer, but transferred on residual voltage (bus 1 took 1.445 seconds to transfer to the RATs, in comparison to bus 2, which took 0.125 seconds). As a result of the delayed transfer, bus 1 voltage decayed from approximately 13.8kV to approximately 1 kV before recovering. This resulted in tripping the circuit breakers for RCPs A and B due to bus undervoltage. The loss of the two RCPs resulted in an automatic reactor trip due to RCP loop flow low.

(02-2014)



LICENSEE EVENT REPORT (LER) CONTINUATION SHEET

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Seabrook Station	05000443	YEAR	SEQUENTIAL NUMBER	REV NO.	3 OF 4
		2014	- 001	- 00	

NARRATIVE

The initiator for the event was the unexpected closure of the B phase pole of the MGB. Approximately fifteen minutes after opening the MGB and prior to the event, an Operations Clearance Lead, performing an observation of the generator tagging evolution to support the turbine overspeed trip test, identified excessive blowdown of one or more phases of the generator breaker poles. The operator questioned a Maintenance Electrician (ME) who agreed that the blowdown did appear excessive and could indicate an air leak. An informal inspection of the B pole cabinet external areas found no obvious sources for an air leak. The ME continued the informal search for the air leak and opened the MGB 'B' pole cabinet (GF2). Because the breaker was in the open position, the ME believed that there could be no adverse impact associated with an inspection inside the cabinet. The ME did not identify a source for the air leak in the cabinet, so he closed the cabinet door.

At 00:26, with the reactor at approximately 15% power, the B phase of the MGB unexpectedly closed, which caused the 345 kV bus 6 to de-energize in order to isolate the breaker failure signal generated by the MGB protection relay. This unexpected closure was reported as coincident with the electrician closing cabinet door GF2. The generator multi-function protective relay initiated protection to isolate the 25 kV main generator output bus. Isolation of the 25 kV bus opens switchyard breakers 11 and 12, and the UAT breakers feeding the station buses. In turn, the opening of the UAT breaker initiates the fast transfer of the station buses to the RAT supply.

Station buses 2, 3, 4 and 6 successfully fast transferred from the UAT to the RAT supply. Buses 1 and 5 transferred on residual bus voltage instead of a fast transfer. The delay associated with the bus 1 and 5 transfer resulted in two RCPs tripping due to low voltage. Loss of the RCPs then resulted in a reactor trip due to reactor coolant loop flow low.

Following the trip, the plant was stable in Mode 3. Plant and Operator response to the reactor trip was evaluated and no issues or abnormalities were identified. A Failure Investigation Process (FIP) team concluded that the most likely direct cause for closing of the MGB breaker B phase was a combination of the air leak and inadvertent contact of the phase B close button during the informal check for air leaks. The team determined that the air leak resulted in less force needed for actuation and the pushbutton was inadvertently bumped by the electrician while in the cabinet.

This event resulted in a valid actuation of the reactor protection system and met the reporting criteria of 10 CFR 50.72(b)(2)(iv)(B). A four hour report was made to the NRC at approximately 0244 on April 1, 2014 (event number 49979). The operators responded to the plant trip in accordance with approved procedures, and safety systems functioned as expected. No adverse consequences resulted from this event, and this incident had no adverse impact on the health and safety of the public or the plant and its personnel. This event did not involve a safety system functional failure. No inoperable structures, systems, or components contributed to this event.

Corrective Actions

The following corrective actions have been completed:

- The involved electrician was coached and mentored concerning this cause (inadvertent bump or jarring) and concerning entry into the B cabinet without authorization.
- Performance of Work Order 40204488 (Preventative Maintenance activity on the breaker), which addressed/corrected the air leaks.

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		YEAR	SEQUENTIAL NUMBER	REV NO.	
Seabrook Station	05000443	2014	- 001	- 00	4 OF 4

NARRATIVE

The following corrective actions are planned:

1. Revise procedure ON1046.12, Operation of the Main Generator Breaker, to:

- Add controls (cautions, prerequisites and/or notes) to communicate the potential risk associated with when the selector switch is in LOCAL, but the lock rods have not yet been installed.
- Ensure consideration of implementing OP-AA-102-1003 "Guarded Equipment" controls.
- Minimize the time spent at risk (switch in LOCAL without lock rods installed).

As part of this procedure change, consider delaying the clearance order implementation until after the lock rods are installed.

2. Brief Maintenance groups (I&C, ME, MM and MS) on this event, including reinforcement of:

- Expectation for obtaining authorization prior to performance of any intrusive activities,
- A belief that there is no "risk" if the component is de-energized (bkr open, switch "off", etc) is an incorrect mindset,
- "Trip Sensitive" labels should be respected at all times, even when the breaker is "open."

Similar Events

Seabrook has experienced no similar events within the last five years involving a plant trip due to the unexpected closure of a main generator breaker phase.

Additional Information

The Energy Industry Identification System (EIIIS) codes are included in this LER in the following format: [EIIIS system identifier, EIIIS component identifier].